

MAYFLIES OF SOUTHWESTERN SIBERIA, RUSSIA (EPHEMEROPTERA)

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Mayflies were studied between 54°-56° N lat. and 82°-84° E long. The present list includes 34 spp., referable to 10 families, including the western-most records of *Isonychia ussurica*, *Rhithrogena bajkova*, *Epeorus pellucidus*, *Ecdyonurus abracadabrus*, *Ephemerella lenoki*, *Ephemerella triacantha*, *Caenis miliaria*, *Baetis ursinus* and *Baetis bacillus* and the easternmost ones of *Caenis pseudorivulorum*, *C. robusta* and *Ephemerella vulgata*. The studied region is a borderland for both the east- and west-palaearctic spp.

INTRODUCTION

Generally the ephemeropteran fauna of western Siberia was very poorly studied. To the best of our knowledge, only three papers were devoted to the mayflies of this region, viz. NOVIKOVA & KLUGE (1997), BRODSKY (1930) and LEPNEVA (1930). BRODSKY (1930) reported 7 species: *Ephemerella orientalis*, *Siphonurus alternarus*, *Ametropus eatoni*, *Epeorus pellucidus*, *Heptagenia fuscogrisea*, *Rhithrogena lepnevae* and

R. sibirica; LEPNEVA (1930) reported *Ephoron virgo*, *Ephemera orientalis*, *Heptagenia fuscogrisea*, *Siphonurus alternarus*, *Ametropus eatoni*, *Baetis* sp., *Caenis* sp. and *Heptagenia* sp. (we use here modern species names rather than those considered synonyms now). The paper by NOVIKOVA & KLUGE (1997) contains a list of 22 species, found in the Khanty-Mansi Autonomous District and Yamalo-Nenets Autonomous District of T'umen' province (between 60°-68° N lat. and 70°-78° E long.); among them there are holarctic, circumarctic, transpalaeartic, west-palaeartic and eastpalaeartic species. KLUGE's (1997) key presents brief information on species distribution.

Our research was conducted southward and to the East of the above mentioned region (between 54°-56° N lat. and 82°-84° E long.). The studied territory is situated in the Ob' river basin, in Novosibirsk province. Larvae and imagoes were collected during 2001 and 2002 by M. Beketov in the rivers Ob', Inya, Berd', Tula, Shipunikha, Ik, Izdrevaya, Nosikha and Mosikha and in various small stagnant water bodies. The territory considered is bordered by the Altai-Sayan Mountain Country in the East and by the West Siberian Lowland in the West, therefore a considerable species diversity might be expected.

SPECIES LIST

B a e t i d a e

- *Cloeon (C.) dipterum* Linnaeus, 1761 (syn. *rufulum* Müller, 1776; *zimini* Tshernova, 1930). Transpalaeartic species.
- *Cloeon (C.) inscriptum* Bengtsson, 1914. Transpalaeartic species.
- *Cloeon (Similicloeon) simile* Eaton, 1870. Transpalaeartic species.
- *Cloeon (Procloeon) bifidum* Bengtsson, 1912 (syn. *ornatum* Tshernova, 1928). Transpalaeartic species.
- *Cloeon (Procloeon) macronyx* Kluge & Novikova, 1992 (syn. *Centroptilum nana* auct.). Possibly a transpalaeartic species; known from the East-European Plain, Kazakhstan and Mongolia.
- *Baetis (Nigrobaetis) bacillus* Kluge, 1983. Eastpalaeartic species; known from Transbaikalia and the Russian Far East.
- *Baetis (Labiobaetis) tricolor* Tshernova, 1928. Transpalaeartic species.

- *Baetis (B.) fuscatus* (Linnaeus, 1761) (syn. *bioculatus* auct.; *venustulus* Eaton, 1885). Transpalaeartic species.
- *Baetis (B.) vernus* Curtis, 1834. Transpalaeartic species.
- *Baetis (B.) ursinus* Kazlauskas, 1963. Eastpalaeartic species; known from the Angara river, Mongolia and from the Russian Far East.

C a e n i d a e

- *Brachycercus harrisella* Curtis, 1834. Transpalaeartic species.
- *Caenis horaria* (Linnaeus, 1758) (syn. *dimidiata* Stephens, 1835). Transpalaeartic species.
- *Caenis lactea* (Burmeister, 1839) (syn. *tumida* Bengtsson, 1912; *nocturna* Bengtsson, 1917; *undosa* Tiensuu, 1939). Possibly a transpalaeartic species; known from Europe, eastern Kazakhstan and Transbaikalia.
- *Caenis miliaria* (Tshernova, 1952). Eastpalaeartic species; known from Altai, Transbaikalia, Mongolia and the Russian Far East.
- *Caenis pseudorivulorum* Keffermuller, 1960 (syn. *beskidensis* Sowa, 1973). Possibly a transpalaeartic species.
- *Caenis robusta* Eaton, 1884 (syn. *incus* Bengtsson; *ulmeri* Brodsky, 1930). Westpalaeartic species; known from Europe, the Caspian Sea and Uzbekistan.

E p h e m e r e l l i d a e

- *Ephemerella ignita* (Poda, 1761) (syn. *lactata* Bengtsson, 1909; *torrentium* Bengtsson, 1917; *sibirica* Tshernova, 1952). Transpalaeartic species.
- *Ephemerella lenoki* Tshernova, 1952 (auct. *rufa* Imanishi; syn. *Uracanthella markevitchi* Belov, 1979). Eastpalaeartic species; known from eastern Kazakhstan, Altai, East Siberia, Mongolia, the Russian Far East and Japan.
- *Ephemerella triacantha* Tshernova, 1949 (syn. *tenax* Tshernova, 1952). Eastpalaeartic species; known from Altai, East Siberia, Mongolia and the Russian Far East.

E p h e m e r i d a e

- *Ephemera orientalis* McLachlan, 1875 (syn. *amurensis* Navas, 1913; *modesta* Brodsky, 1930). Eastpalaeartic species.
- *Ephemera vulgata* Linnaeus, 1758. Westpalaeartic species.

H e p t a g e n i i d a e

- *Heptagenia (Kageronia) fuscogrisea* (Retzius, 1783). Possibly a transpalaeartic species; known from Europe, West Siberia and East Siberia.
- *Heptagenia (H.) flava* Rostock, 1878 (syn. *arsenjevi* Tshernova, 1952). Transpalaeartic species.
- *Heptagenia (H.) sulphurea* (Müller, 1776). Transpalaeartic species.
- *Ecdyonurus (Afghanurus) joernensis* Bengtsson, 1909 (syn. *mongolicus* Bajkova et Varychanova, 1978; *dentatus* Braasch, 1979; *stuppei* Braasch, 1979). Almost a transpalaeartic species; distributed in Scandinavia, East-European Plain, Ural, Siberia, Mongolia, the Russian Far East and Korea.
- *Ecdyonurus (Afronurus) abracadabrus* Kluge, 1983. Eastpalaeartic species; known from Evenkia, Transbaikalia and the Russian Far East.
- *Rhithrogena bajkovae* Sowa, 1973. Eastpalaeartic species; known from Transbaikalia, Mongolia and the Russian Far East.
- *Epeorus (Belovius) pellucidus* (Brodsky, 1930) (syn. *smirnovi* Tshernova, 1978). Eastpalaeartic species; known from eastern Kazakhstan, Altai, East Siberia and Far East.

I s o n y c h i i d a e

- *Isonychia ussurica sibirica* Tiunova et al., (in press). Siberian subspecies of the eastpalaeartic *Isonychia ussurica* Bajkova, 1970.

L e p t o p h l e b i i d a e

- *Choroerpes (Euthraulius)* sp. Probably referable to the eastpalaeartic *C. (E.) altioculus* Kluge, 1984.
- *Leptophlebia (Paraleptophlebia) submarginata* (Stephens, 1835). Westpalaeartic species; known from Europe and eastern Kazakhstan.

P o l y m i t a r c y i d a e

- *Ephoron* sp. larvae could not be identified to the species level. LEPNEVA (1930) reported *E. virgo* (Olivier 1791), but at that time

the taxon could be confused with *E. shigae* Takahashi, 1924 or *E. (Eopolymitarcys) nigradorsum* (Tshernova, 1934).

P o t a m a n t h i d a e

- *Potamanthus luteus* (Linnaeus, 1767). Transpalaeartic species.

S i p h l o n u r i d a e

- *Siphonurus alternarus* Say, 1824 (syn. *linnaeanus* Eaton, 1871; *thomsoni* Bengtsson, 1909; *oblita* Bengtsson, 1909). Transholarctic species.

DISCUSSION

The fauna of the region includes 18 transpalaeartic and transholarctic, 1 Scandinavian/eastpalaeartic, 10 eastpalaeartic and 3 westpalaeartic species. *Choroterpes (Euthraulius)* sp. and *Ephoron* sp. could not be identified to species level, therefore their ranges are unclear.

The most interesting discoveries are the following:

- *Ephemera vulgata*. – A single male imago near the Berd' river, 22-VI-2002. As far as we know, this species was not previously recorded for Asia.
- *Caenis pseudorivulorum*. – 119 larvae in the Inya and Berd' rivers throughout the summer of 2002. So far it was known from Europe only, but its transpalaeartic distribution can not be excluded.
- *Caenis robusta*. – Larvae were collected in a pond in the city of Novosibirsk (July 2002), which is the easternmost locality known for this species. The eggs, extracted from a mature female larva, have a reticulated surface, a diagnostic feature that separates this species from the eastpalaeartic *C. miliaria*.

For some species, the westernmost localities were discovered:

- *Isonychia ussurica sibirica*. – 5 imagoes (10-VII-2002) and 3 larvae (14/19-VII-2002) from the Inya river.
- *Rhithrogena bajkovaе*. – Larvae from the Inya river in Novosibirsk, 30-V-2002. Subimaginal genitals with pointed titillators, in mature male larva, allow its separation from the related *R. lepnevae*.
- *Epeorus (Belovius) pellucidus*. – Larvae were collected in the Inya (3 specimens, 27-V-2002) and Berd' (6 specimens, 4-IX-2002) rivers.

- *Ecdyonurus (Afromurus) abracadabrus*. – Larvae were collected in the Inya river at Novosibirsk, 19-VII-2002.
- *Ephemerella (Uracanthella) lenoki*. – Larvae and imagoes from the Inya and Berd' rivers (69 specimens, May to September 2002).
- *Ephemerella (Drunella) triacantha*. – Larvae were collected in the Berd' river near Novososedovo, 22-VI-2002.
- *Caenis miliaria*. – 16 larvae from Gluchoe Lake near the Ob' river, 1-VII-2002.
- *Baetis ursinus*. – 1 larva from the Berd' river, 20-VIII-2002.
- *Baetis (Nigrobaetis) bacillus*. – 17 larvae from the Inya river near Novosibirsk city and 10 larvae near Otgonka railway station, 19/27-VII-2002.

Undoubtedly, the occurrence of numerous eastern species in the lowland rivers of southwestern Siberia is affected by the neighbouring Altai-Sayan Mountain Country. The latter is part of a great mountain system stretching from Altai in the SW and Putorana Mountains in the NW, to the Pacific Ocean in the East. This area has a specific rhithral mayfly fauna, while the potamal fauna includes many transpalaeartic species.

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211

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